

CYCLODEXTRIN PARTICLE

CROSS REFERENCE TO RELATED APPLICATION

This application is a national stage of PCT/EP03/09713 filed Sep. 2, 2003 and based upon DE 102 40 698.7 filed Sep. 4, 2002 under the International Convention.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention concerns flavor and/or fragrance containing cyclodextrin particles containing cellulose ether with a particle size in the range of 50 to 1000 μm , products containing these particles, a process for their manufacture as well as their use in consumables, pharmaceutical products and everyday articles.

2. Description of the Related Art

Cyclodextrins are oligomers of anhydroglucose units, which are linked via α -1,4 linkages into a ring shaped molecule. Depending upon the number of the units one refers to these as α (6 unit), β (7 unit) and γ (8 unit) cyclodextrin. These are conventionally produced from starch by enzymatic processes. The toroidal structure of the cyclodextrin makes possible the formation of an enclosing complex on a molecular level. Depending upon the geometry and polarity of the flavor material it is possible to form more-or-less stable complexes with the guest molecule resting stably in the polar cyclodextrin cavity.

Flavor substances are generally unstable compounds, which exhibit high rates of loss during storage or during processing for example in the foodstuff industry, due to evaporation or oxidation. The cyclodextrin complexes can protect these flavor substances against these losses.

In the case of flavor materials and fragrance materials, or as the case may be, flavors and fragrance mixtures, these are generally volatile, generally liquid substances, or as the case may be, complex mixtures of these substances. It is conventional to encapsulate these substances or substance mixtures by spray drying; however, generally only relatively fine and irregularly structured particles are obtained.

For the production of complexes of flavor and/or fragrance substances enclosed with cyclodextrin, various methods are known.

These methods include the mixing of cyclodextrin solutions, suspensions or pastes (generally in water) and the flavor and/or aroma substances. Depending upon the polarity of the flavor and/or fragrance substance, there results thereby usually a two-phase mixture. For accelerating this process one thus employs elevated shear forces, for example involving stirring or kneading. Subsequently there is generally a drying step, for example spray drying, freeze drying or fluidized bed drying.

According to the known state of the art, the product of drying by spray drying aqueous aroma/cyclodextrin complexes without additives is very fine particles.

EP-A 392 608 describes a method for producing powdered cyclodextrin complexes, of which the particle size is less than 12, preferably less than 5 μm . Therein processes such as, for example, spray drying and freeze-drying are employed.

This small particle size is disadvantageous for practical use. Fine particle cyclodextrin complexes can only be dispersed in water with difficulty; the solubilization speed is thereby reduced. Besides this, in the case of employment of small (typically <10 μm) cyclodextrin particles in dry mix-

tures, which primarily include main components with a particle size of between 50 and 500 μm , there is a danger of de-mixing.

In addition, in the case of small particle sizes, it is disadvantageous that often the pourability or flowability is reduced and dust easily develops.

For this reason it is of advantage when the cyclodextrin complex particles have particle sizes of at least 50 μm .

During spray drying, a portion of the flavor and/or fragrance substances remain on the surface of the particles. This so-called surface oil leads to a reduction in the oxidation stability and further reduces the pourability. It is preferred to have the proportion of surface oil as low as possible.

DE-A 31 05 666 describes a process wherein particles with a particle size of 500 to 1000 μm are produced by adding a binder to cyclodextrin complex mixtures in a kneader with subsequent drying and grinding.

Disadvantageous with such kneading process is the high proportion of surface oil in the finished granules. Besides this, with regard to the manufacturing costs, the use of multiple process steps (kneading, drying, grinding, sifting) is disadvantageous.

In EP-A 1 064 856, particles containing carbohydrates and/or polyhydroxy compounds with sizes in the range of 100 to 400 μm are described. The therein disclosed multi-stage process for producing these particles includes, in addition to spray drying, further steps. One of the steps involves the return of smaller particles formed in the process, so that these grow into the desired particle size range by agglomeration. These particles are disadvantageous in their low handling stability and their surface oil content.

BRIEF SUMMARY OF THE INVENTION

The task of the present invention is comprised therein, to provide flavor and/or fragrance containing cyclodextrin particles with a size of at least 50 μm , which avoid the above-described disadvantages according to the state of the art and provide a simple as possible process for production of such particles. In addition, a narrow particle size distribution would be advantageous.

DETAILED DESCRIPTION OF THE INVENTION

The subject of the present invention is thus flavor and/or fragrance containing cyclodextrin particles with a particle size in the range of 50 to 1000 μm containing a cellulose ether obtainable by a one step fluidized bed process from a spray mixture, wherein the gas inlet temperature lies at 80 to 180° C. and the gas exit temperature at 40 to 95° C.

A further aspect of the present invention is a process for producing cyclodextrin particles, thereby characterized, that in a first stage fluidized bed device an aqueous spray mixture is introduced that contains at least one cyclodextrin, at least one flavor and/or fragrance substance and at least one cellulose ether.

The invention further concerns products containing the inventive cyclodextrin particles as well as the use of the inventive cyclodextrin particles in consumables, pharmaceutical products and everyday articles.

For producing the particles from the spray mixture various known processes for granulation can be employed. The useful process according to the invention is single-stage, that is, the spray mixture is supplied to a device and, upon leaving the device, the manufacturing is already completed